

UEE503: NETWORK ANALYSIS AND SYNTHESIS

L	T	P	Cr
3	1	0	3.5

Course Objective: To make the students understand concepts of graph theory, two port networks, and network synthesis.

Graph theory: Graph, Tree and link branches, Network matrices and their relations, Choice of linearly independent network variables, Topological equations for loop current and topological equation for nodal voltage, Duality

Network Theorems: Source transformation, Superposition Theorem, Thevenin's theorem, Norton's theorem, Millman's theorem, Reciprocity theorem and Maximum power transfer theorem as applied to A.C. circuits, Compensation theorem, Tellegen's theorem and their applications.

Two Port Networks: Two port network description in terms of open circuits impedance, Short circuit admittance, Hybrid and inverse hybrid, ABCD and inverse ABCD parameters, Inter-connection of two port network, Indefinite admittance matrix and its applications

Network Functions: Concepts of complex frequency, Transform impedance, Networks function of one port and two port network, concepts of poles and zeros, property of driving point and transfer function.

Passive Network Synthesis: Introduction, Positive Real Functions : Definition, Necessary and sufficient conditions for a function to be positive real, Elements of circuit synthesis, Foster and cauer forms of LC Networks, Synthesis of RC and RL networks.

Course Learning Outcomes (CLO):

After the successful completion of the course the students will be able to:

1. understanding the various laws and theorems related to electric networks.
2. understanding the concept of two port networks.
3. familiarisation with network synthesis.

Text Books:

1. Hayt, W., *Engineering Circuit Analysis*, Tata McGraw-Hill (2006).
2. Hussain, A., *Networks and Systems*, CBS Publications (2004).
3. Valkenberg, Van, *Network Analysis*, Prentice-Hall of India Private Limited (2007).
4. Gayakwad, A. *Op-Amps and Linear Integrated Circuits*, Prentice-Hall of India (2006).

Reference Books:

1. Chakarbarti, A., *Circuit Theory*, Dhanpat Rai and Co. (P) Ltd. (2006).
2. Roy Chowdhury, D., *Networks and Systems*, New Age International (P) Limited, Publishers (2007).
3. Sudhakar, A., *Circuits and Networks*, Tata McGraw-Hill (2006).
4. Suresh Kumar, K.S. *Electrical circuits and Networks*, Pearson Education, (2009).

Evaluation Scheme:

S.NO.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	45
3	Sessional (May include Assignments//Quizzes/Lab Evaluations)	25